



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Werner HELMS, *et al.*

Serial No.: 10/501,812

Filed: July 24, 1998

For: MULTI-CHAMBER FLAT TUBE

Group Art Unit: 3721

Examiner: C. Harmon

Attorney Docket No.: 16906/320

Confirmation No.: 4934

Assistant Commissioner for Patents
Washington, D.C. 20231

Declaration under 37 CFR 1.132

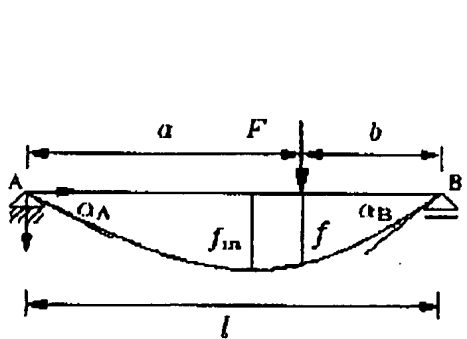
I, Werner Oswald, declare that:

1. I am an engineer currently employed by Behr GmbH & Co. of Stuttgart, Germany ("Behr"), assignee of the above-identified patent application, and I have been employed by that company since 1985. During that time, I have been engaged in the design of automotive heating and air-conditioning systems, and I presently serve as Manager Advanced Engineering Tubes & Turbulators.
2. I have read the patent application identified above as well as the Office Action mailed on April 19, 2007, in connection with that application.
3. In the Office Action, the U.S. PTO Examiner has taken the position that the indentation shown in the tube wall of FR 2780153 can be considered as a "plateau" and that it would be "deformable" and therefore capable of deforming in response to excess length of the vertical web during manufacture of the tube. The features and properties at issue here are physical properties of the tube that affect the structure of the tube claimed in the claims of the above application.
4. I believe the PTO's interpretation of the physical properties and structure taught in FR 2780153 to be factually erroneous. I have performed the following calculation to demonstrate that the indentation of FR 2780153 is not "deformable" in the manner that a person skilled in the art would understand that term, in light of the disclosure of the present invention in this application.

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The general equation for calculating the deformation in a structure of the type defined by the claims is a follow:



$$f = \frac{Fl^3}{3EI} \frac{a^2b^2}{l^4}$$

 $a > b :$

$$x_m = \sqrt{\frac{1}{3}(l^2 - b^2)}$$

$$f_m = \frac{Fl^3}{9EI} \frac{b}{l} \sqrt{\frac{1}{3} \left(1 - \frac{b^2}{l^2}\right)^3}$$

 $a < b :$

$$x_m = l - \sqrt{\frac{1}{3}(l^2 - a^2)}$$

$$f_m = \frac{Fl^3}{9EI} \frac{a}{l} \sqrt{\frac{1}{3} \left(1 - \frac{a^2}{l^2}\right)^3}$$

This includes the situation in which $a = b = \frac{1}{2}$, whereby in the symmetrical case $a = b = \frac{1}{2}l$.

The maximum deformation f_m obtained according to the following relationship: $f_m = F \cdot l^3 / 48 \cdot E \cdot I$ ✓

Thus, $F = f_m \cdot 48 \cdot E \cdot I / l^3$ ✓

In comparative calculations in which $f_m = 0.05\text{mm}$ and $b = 0.2\text{mm}$ and for the three cases in which the length equals 3 times b , 2 times b and one time b , the following values for the size of the force F are determined:

$$l = 3 \cdot b = 0.6\text{mm}:$$

$$F = f_m \cdot 48 \cdot E \cdot I / l^3 = 11.11 \cdot E \cdot I$$
 ✓

$$l = 2 \cdot b = 0.4\text{mm}:$$

$$F = f_m \cdot 48 \cdot E \cdot I / l^3 = 37.5 \cdot E \cdot I$$
 ✓

$$l = 1 \cdot b = 0.2\text{mm}:$$

$$F = f_m \cdot 48 \cdot E \cdot I / l^3 = 300 \cdot E \cdot I$$
 ✓

Because the length l is subjected to the third power in the calculation, the amount of force required to deform the sheet by an amount equal to the maximum deformation becomes nearly 30 times greater as the length becomes shorter. These calculations demonstrate

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that the very short width of the indentation shown in FR 2780153 (i.e. having a horizontal surface as shown in Fig. 3, which would be capable of deformation, that is less than two times the thickness of the metallic web used to form the tube), would not be reasonably capable of deformation under the conditions used to form the tube.

I further declare that all statements made in this declaration of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful, false statements may jeopardize the validity of legal decisions of any nature based on them.

Date: 17.08.07